

Meshing - Advanced Size Function

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Advanced Size Function

an ANSYS Tutorial

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Advanced Size Function

The Advanced Size Function option allows for greater control over global sizing functions. This controls the following properties

- Angles between normals for adjacent mesh elements
(Curvature-type size function)
- Number of mesh elements employed in the gaps between two geometric entities (Proximity-type size function)
- Gradation between minimum and maximum sizes based on a specified growth rate (All size functions)

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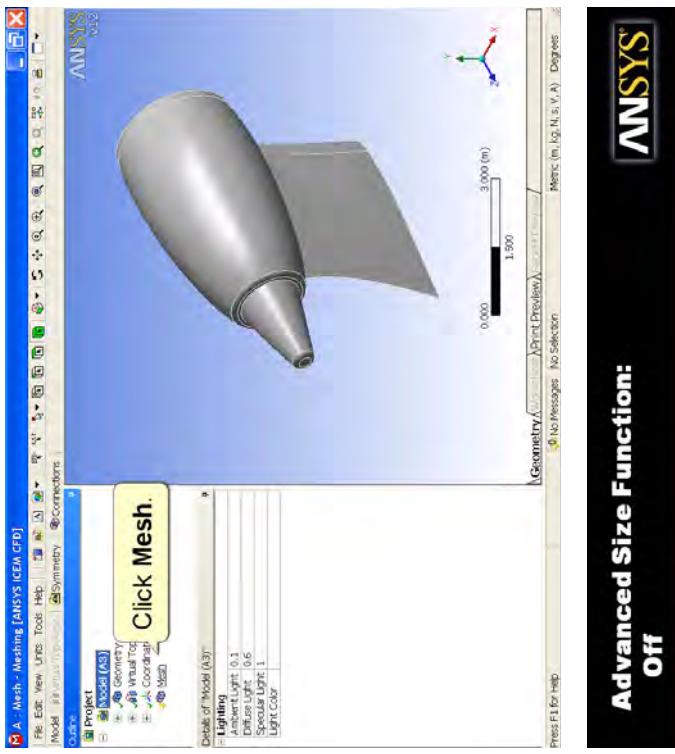
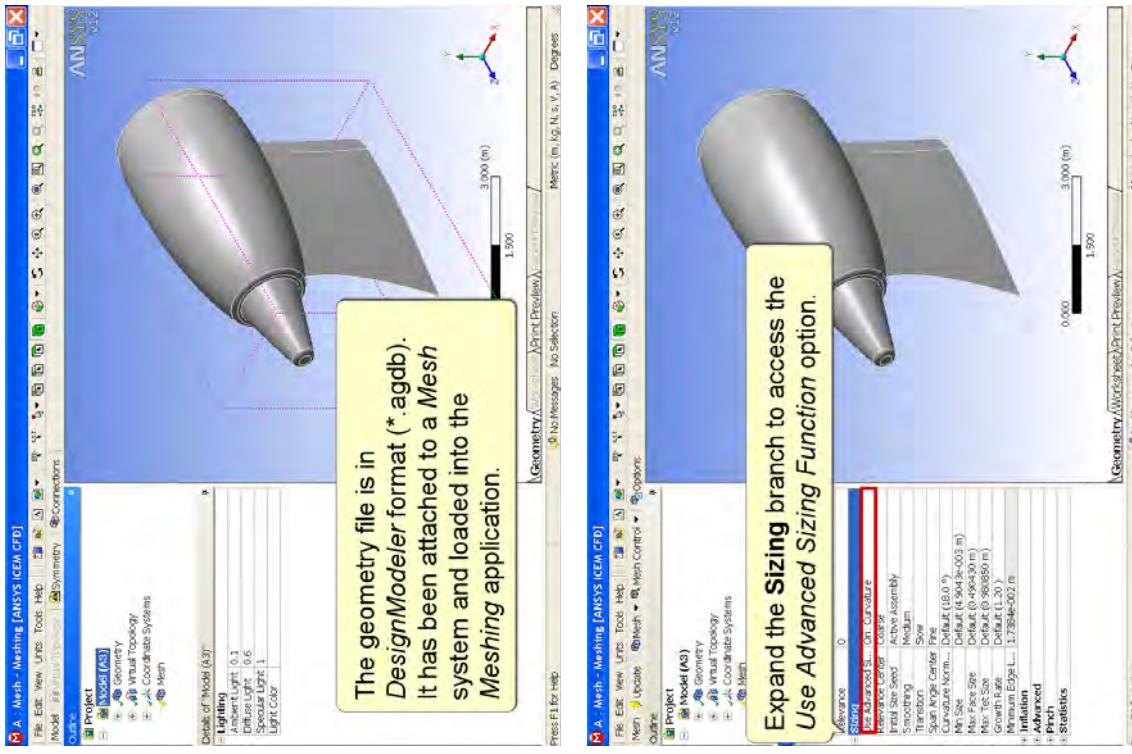
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This tutorial demonstrates the influence of different Advance Size Function options on the mesh of this nacelle geometry.

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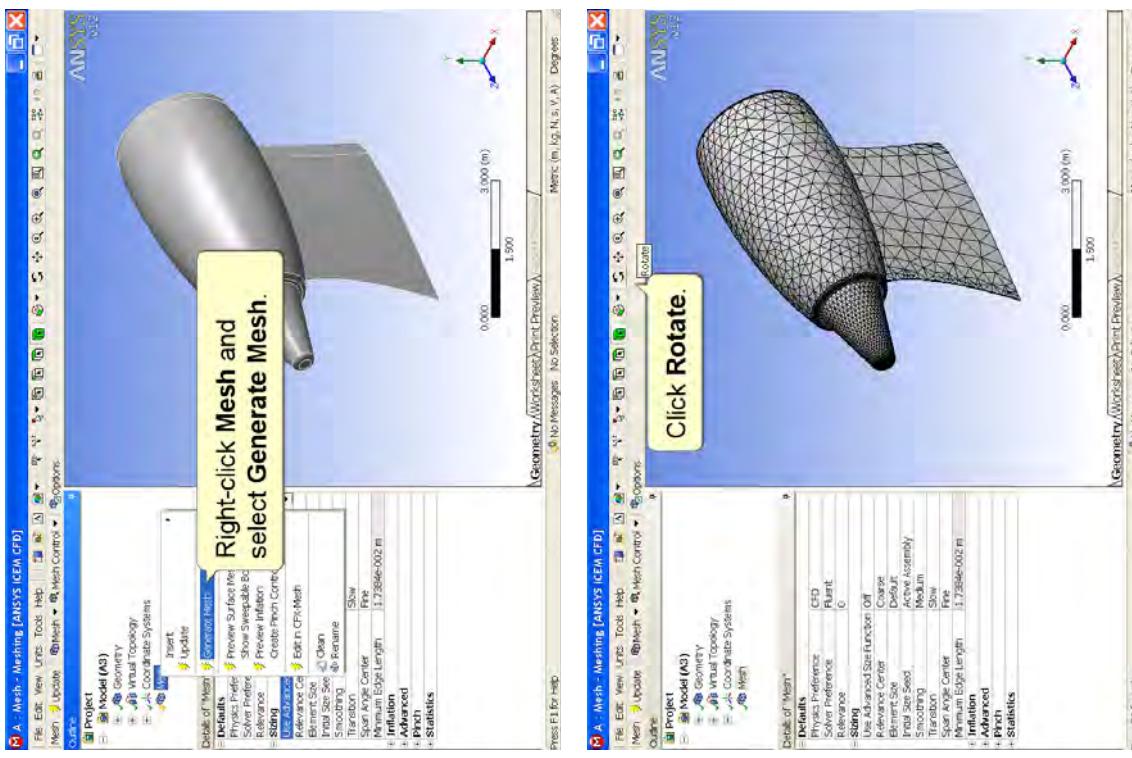
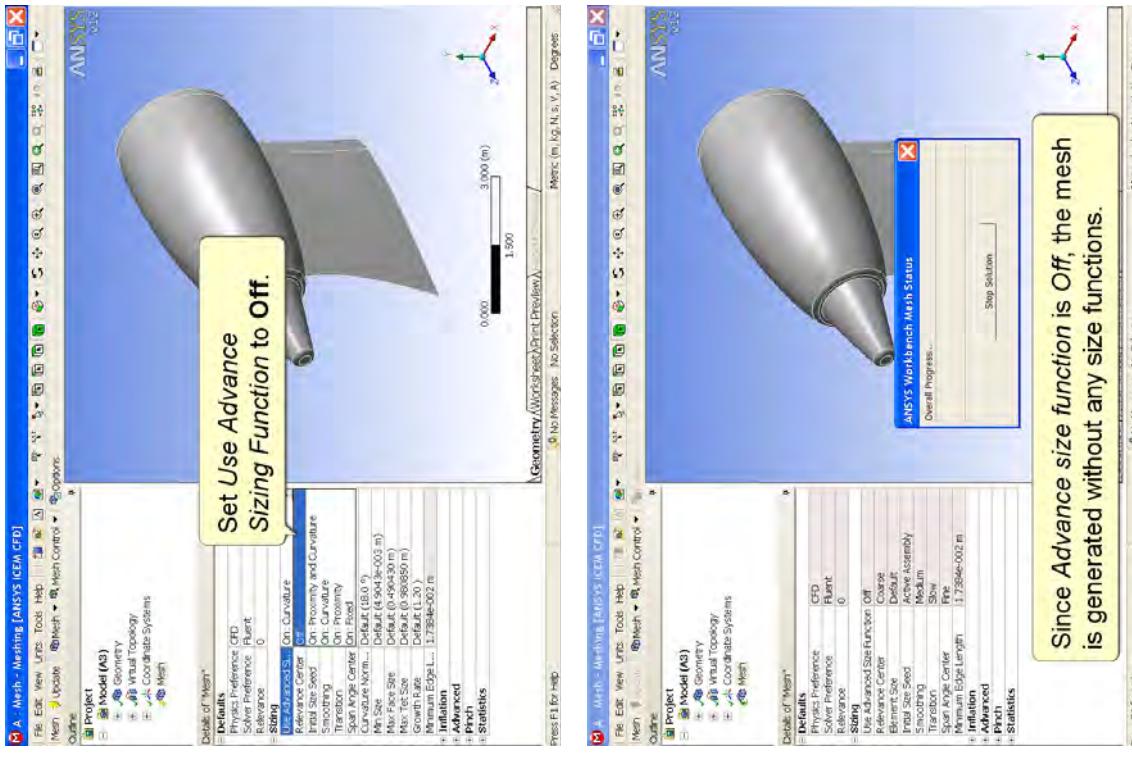


When the Use Advanced Size Function control is Off, the mesher uses the value of the element size to determine a starting point for the mesh size. The value of the element size can be automatically computed by the mesher or user-defined.

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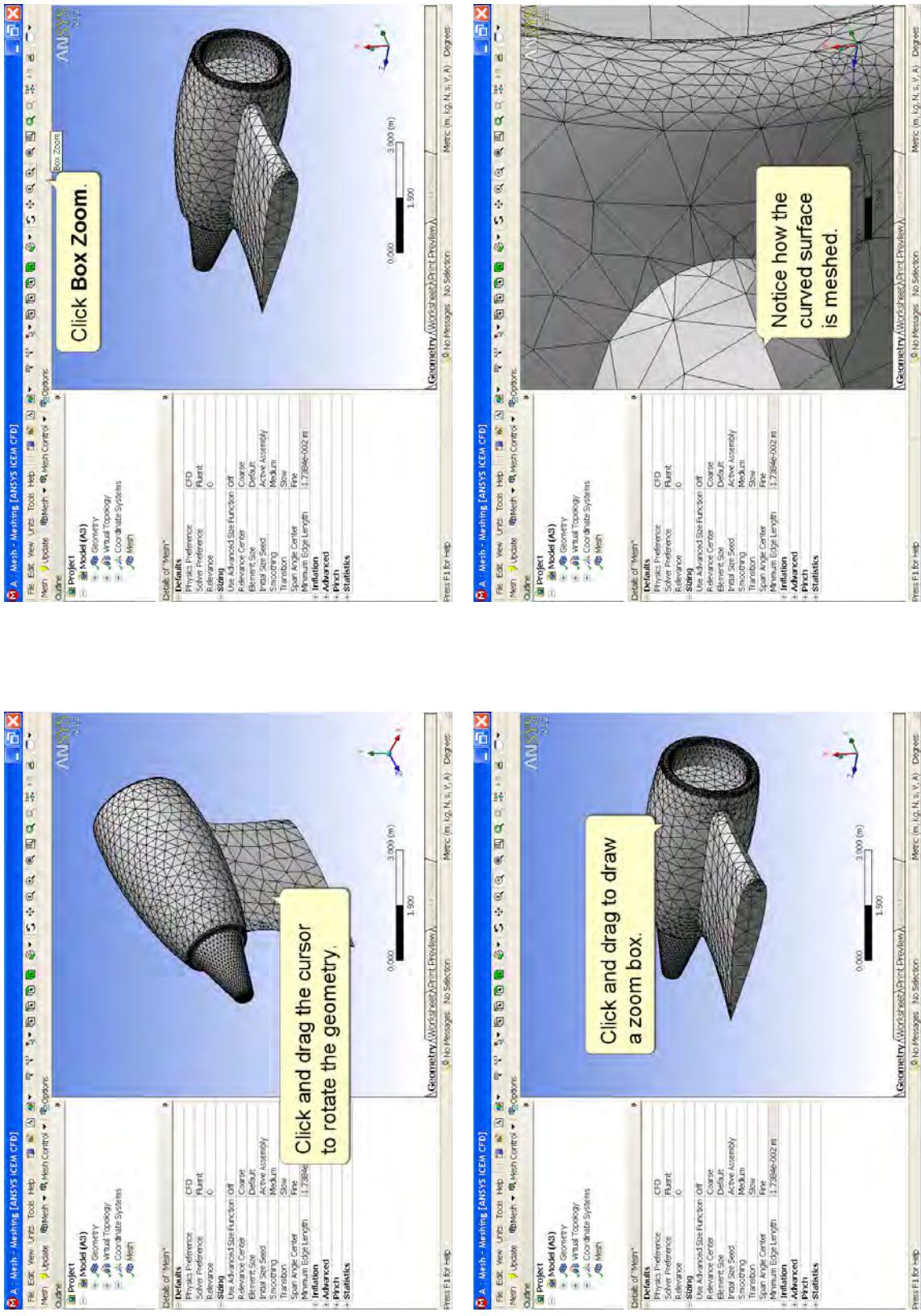
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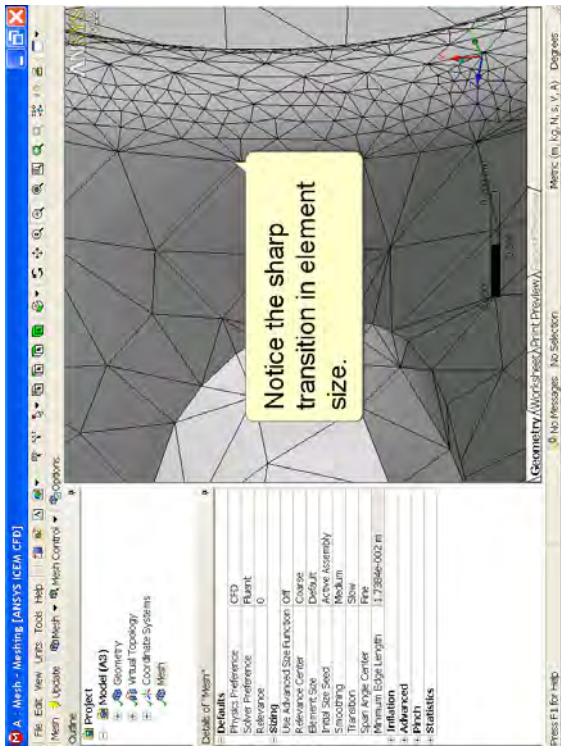


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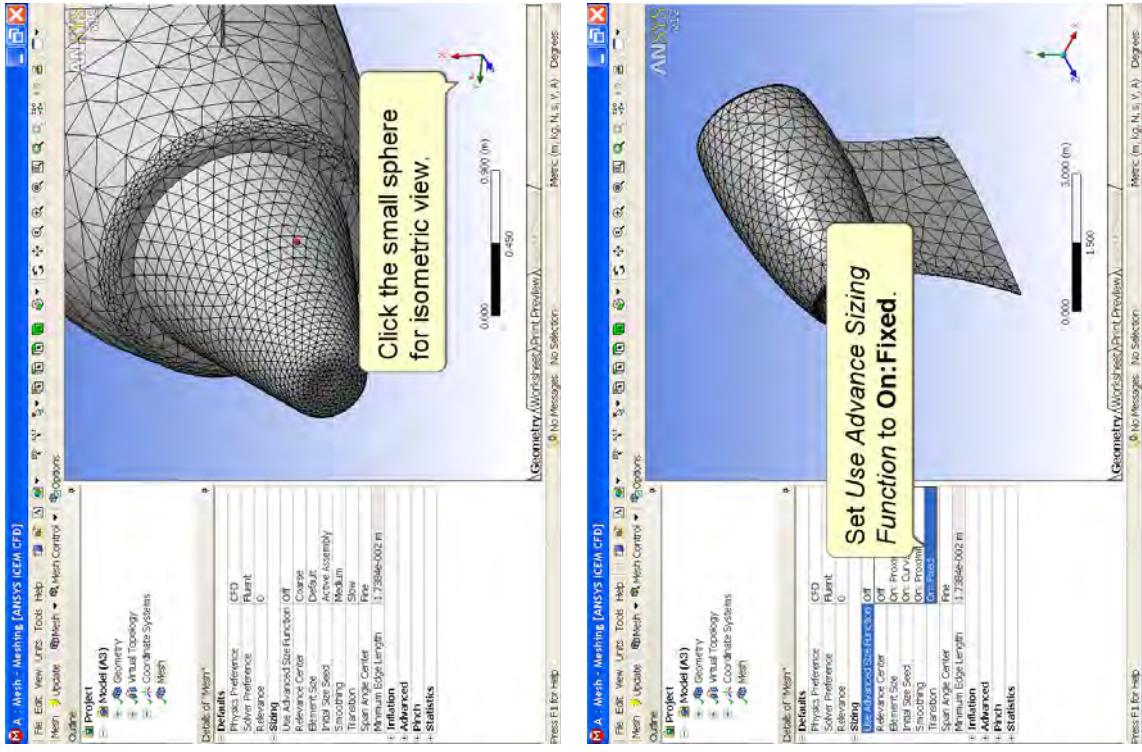


Advanced Size Function: On: Fixed

When the *Advanced Size Function* is On and set to *Fixed* the following factors contribute to the final mesh distribution obtained by the mesher:

- Min Size
- Max Face Size
- Max Tet Size
- Growth Rate

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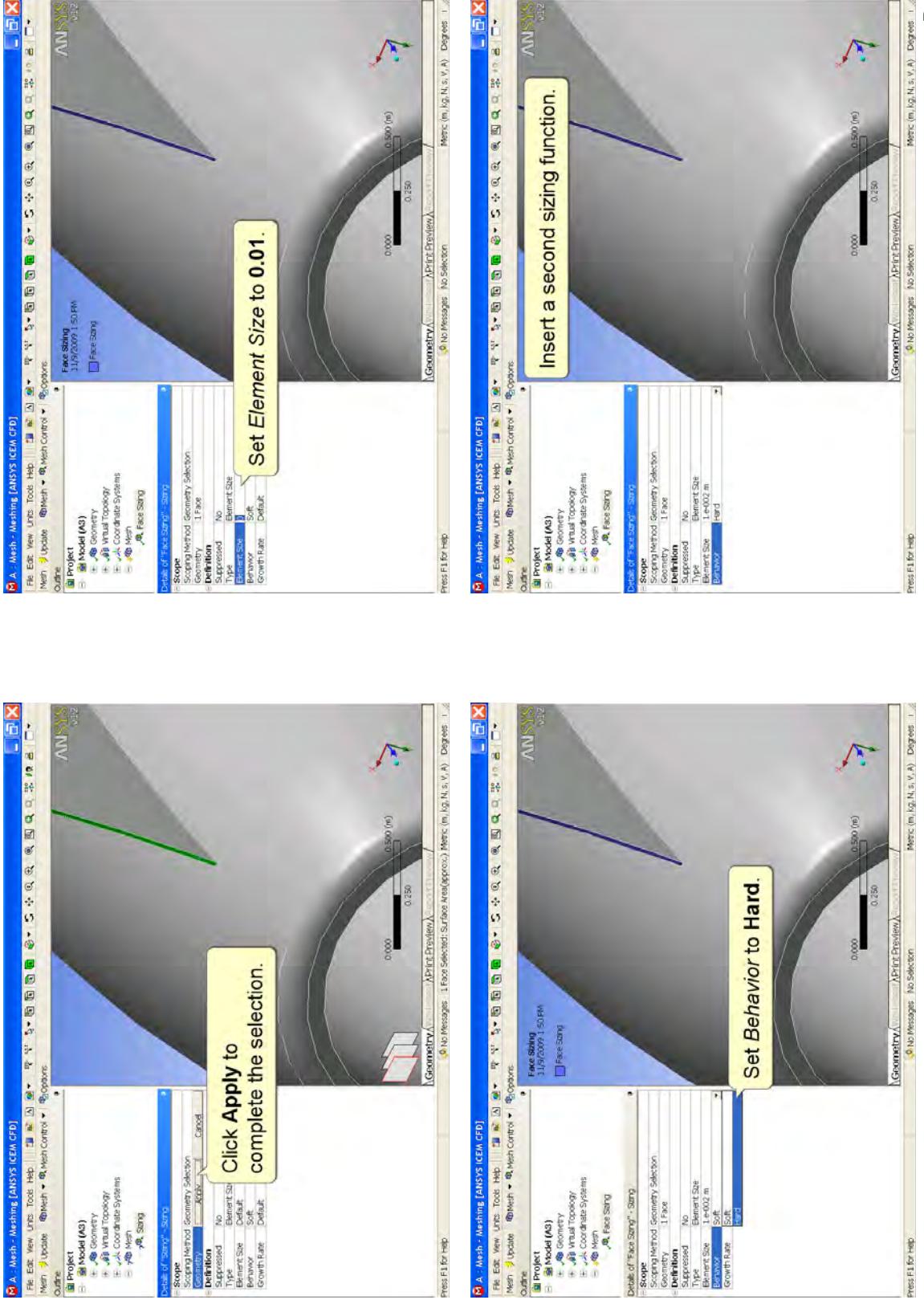
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Insert Sizing Functions from Mesh.

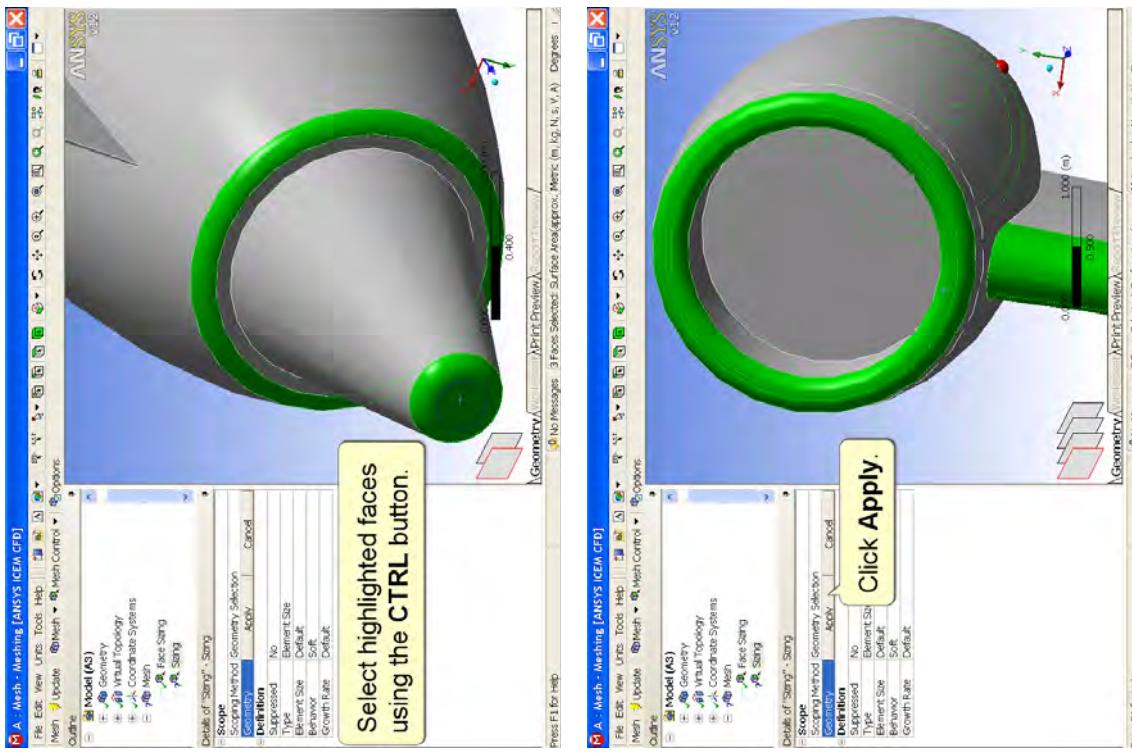
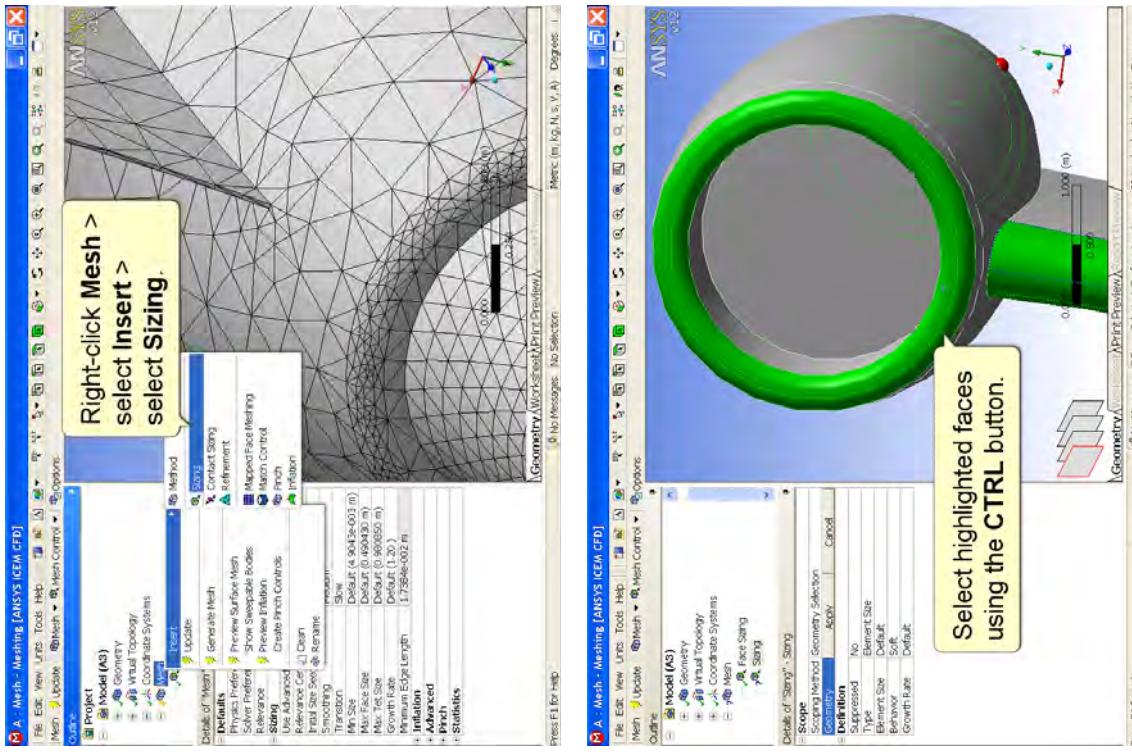
Right-click Mesh > select Insert > select Sizing.

Set selection filter to Face.

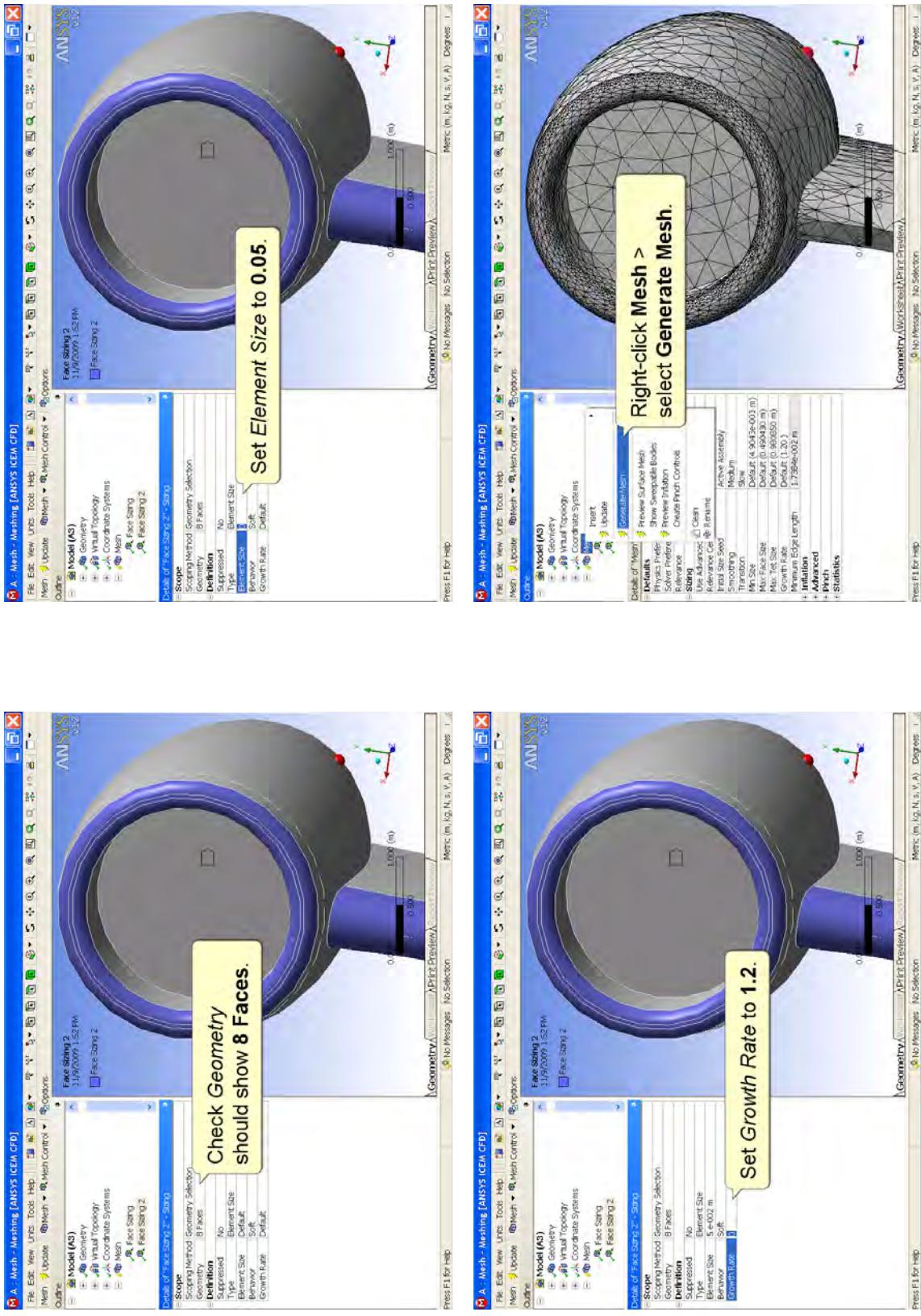
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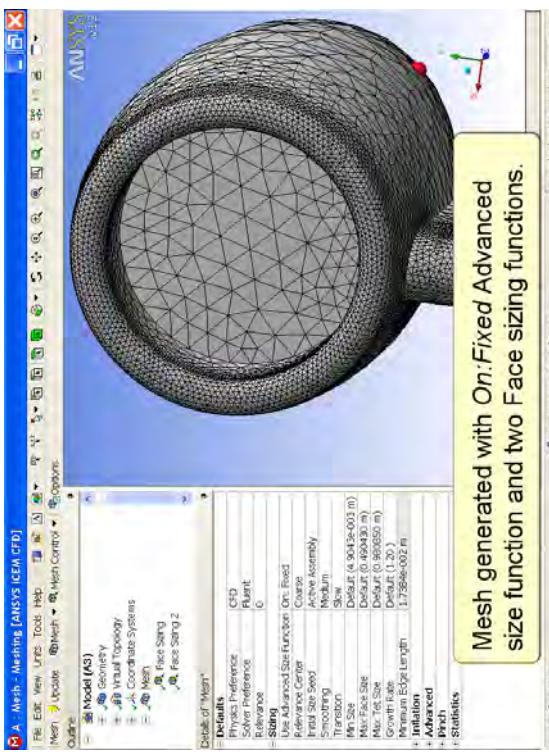
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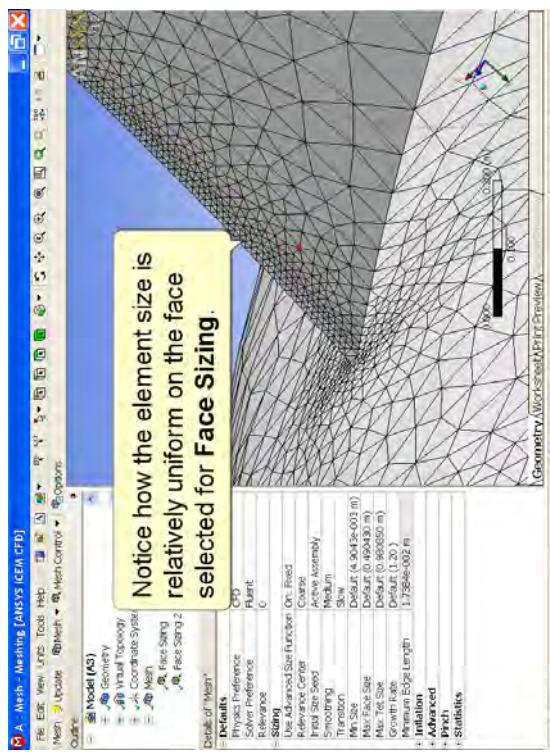
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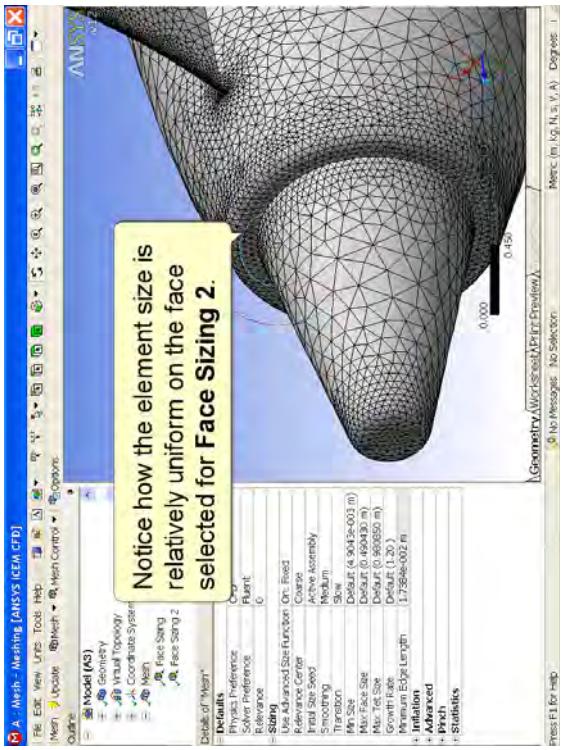
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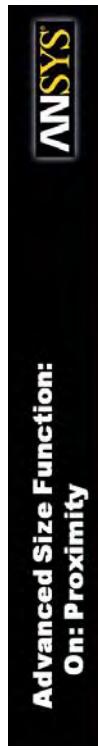
Mesh generated with On:Fixed Advanced size function and two Face sizing functions.



Notice how the element size is relatively uniform on the face selected for **Face Sizing**.



Notice how the element size is relatively uniform on the face selected for **Face Sizing 2**.

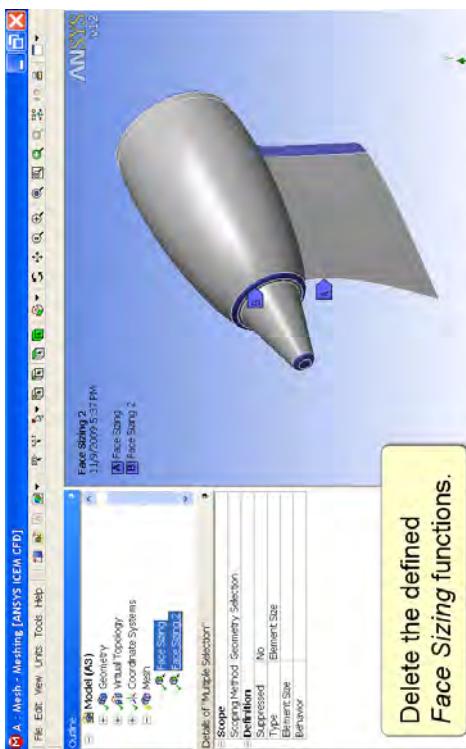


Advanced Size Function: On: Proximity

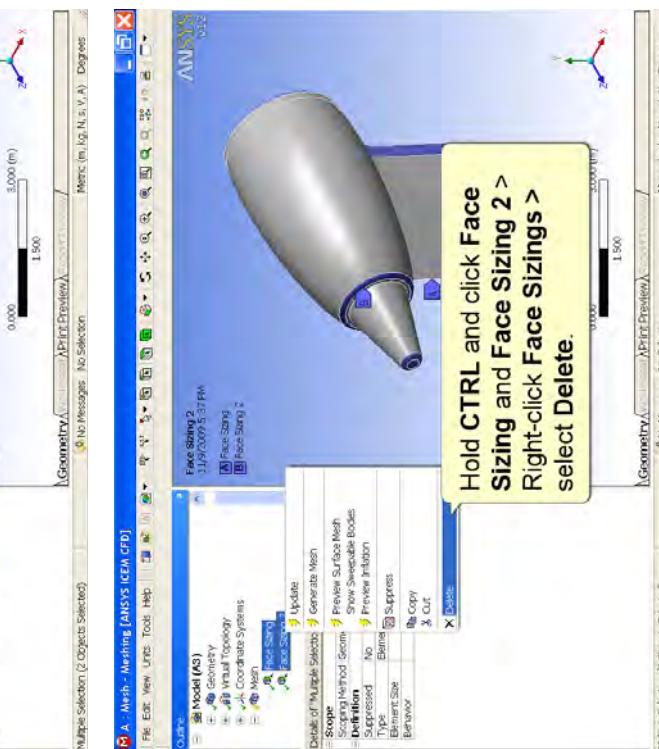
- The *Proximity Size Function* allows you to specify the minimum number of element layers created in regions that constitute “gaps” in the model. For the purposes of specifying a proximity size function, a “gap” is defined in one of two ways:
 - The internal volumetric region between two faces
 - The area between two opposing boundary edges of a face

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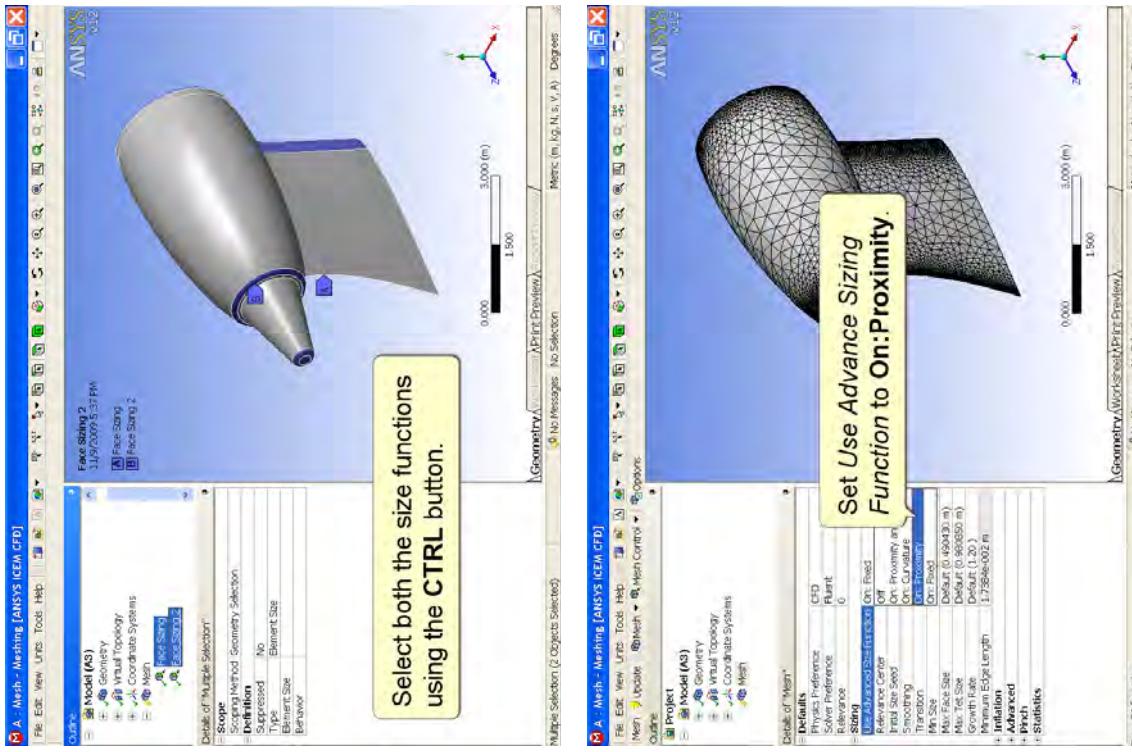
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Delete the defined Face Sizing functions.



Hold CTRL and click Face Sizing and Face Sizing 2 > Right-click Face Sizings > select Delete.



Select both the size functions using the CTRL button.

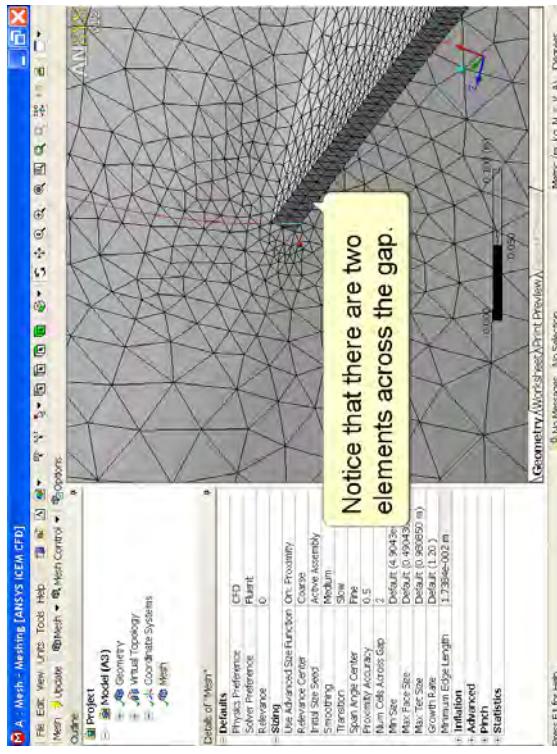
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Set Num Cells Across Gap to 2.

To change the default proximity settings select the respective field and enter new value.

Right-click Mesh and select Generate Mesh.

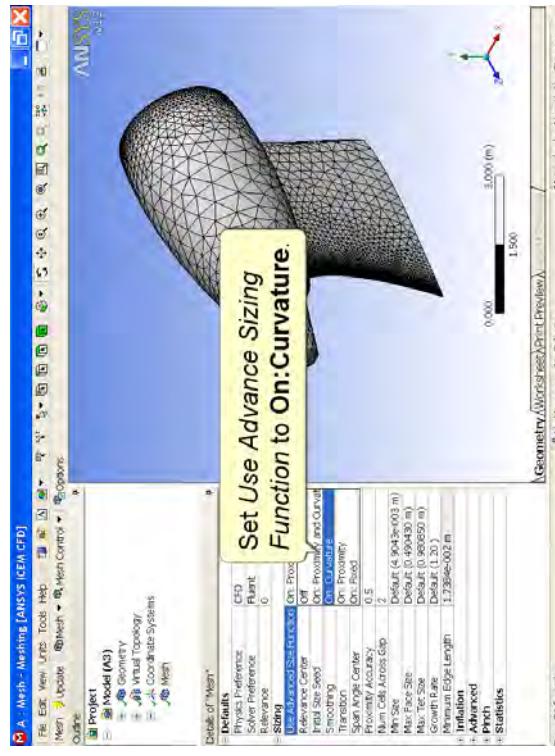
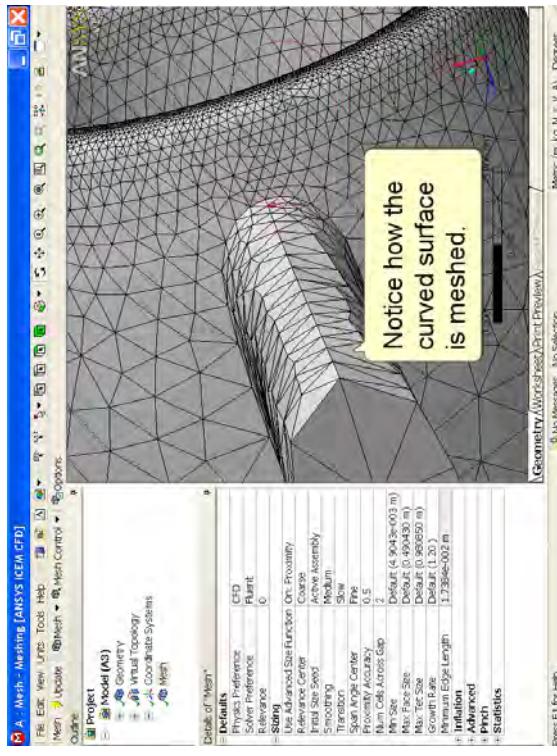
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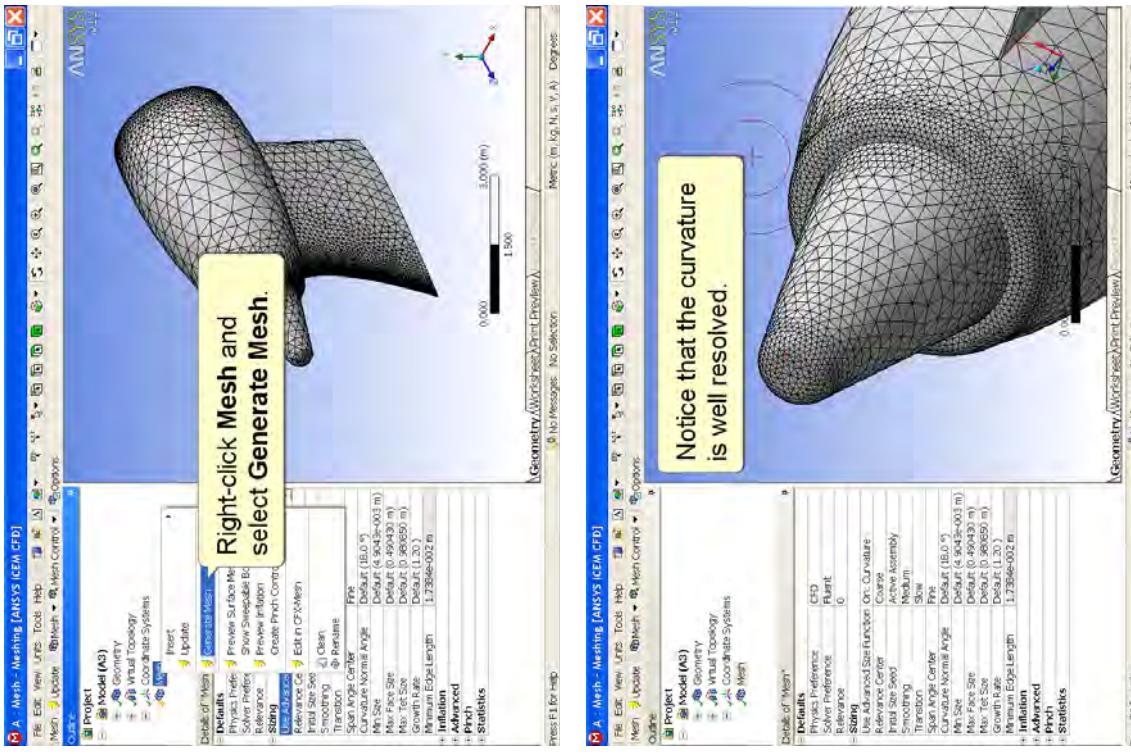
Advanced Size Function: On: Curvature

The **Curvature Size Function** examines curvature on edges and faces and computes element sizes on these entities such that the size will not violate the maximum size or the curvature normal angle, which are either automatically computed by the mesher or defined by the user.

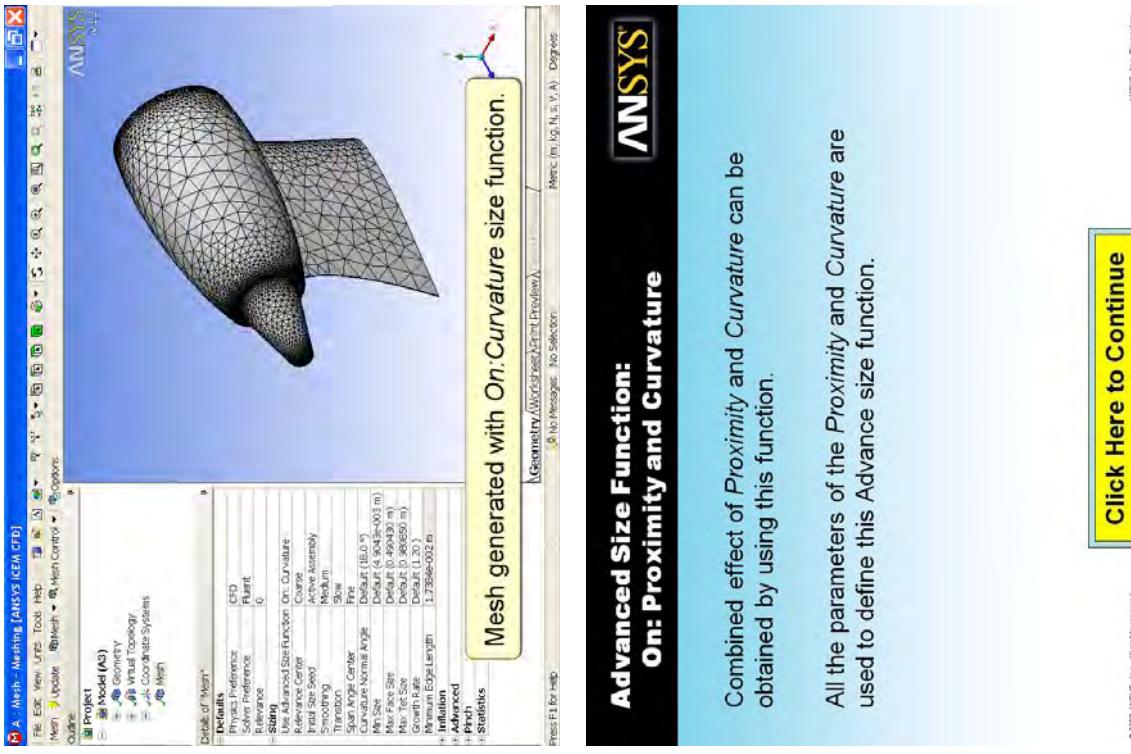
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Notice that the curvature is well resolved.



**Advanced Size Function:
On: Proximity and Curvature**

All the parameters of the *Proximity* and *Curvature* are used to define this *Advance size function*.

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Set Use Advance Sizing Function to On:Proximity and Curvature.

Right-click Mesh and select Generate Mesh.

Mesh generated with On:Proximity and Curvature size function.

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